Abstract of the Disclosure

A method determines approximate probabilities of states of a system represented by a model. The model includes nodes connected by links. Each node represents possible states of a corresponding part of the system, and each link represents statistical dependencies between possible states of related nodes. The nodes are grouped into arbitrary sized clusters such that every node is included in at least one cluster and each link is completed contained in at least one cluster. Messages, based on the arbitrary sized cluster, are defined. Each message has associated sets of source nodes and destination nodes, and a value and a rule depending on other messages and on selected links connecting the source nodes and destination nodes. The value of each message is updated until a termination condition is reached. When the termination condition is reached, approximate probabilities of the states of the system are determined from the values of the messages.